

SECTION 15

TRAFFIC IMPACT STUDIES

I. Authority & Responsibility

It shall be the responsibility of the Division of Highways, PS & E Section to determine when a Traffic Impact Study (TIS) should be done and to recommend this to the developer or property owner, and to the local zoning agency. If a TIS is to be performed, the PS & E Section will direct its preparation and will provide comments based on it to the local zoning agency.

If a developer or property owner desires to proceed with a project for which a TIS is recommended, they shall assume full responsibility for all costs incurred in its preparation. To be qualified to perform a TIS, a private party must be certified in Traffic Engineering by the DelDOT Consultant Control Committee.

II. Bases for Recommending a TIS

A. When in a local zoning process, the Division of Highways finds that a proposed change in zoning could result in a development exceeding the relevant ADT volume shown in Table 1: or

B. When in local zoning process, the Division of Highways finds that a proposed change in zoning could result in a roadway or intersection operating or continuing to operate below level of service D; or

C. When in the review of a Major Subdivision or Land Development Plan, the Division of Highways determines that further traffic information is needed to review the plan; or

D. When in the opinion of the Department of Transportation, it is in the public interest to obtain further traffic information on a proposed development being reviewed by a process not covered in A, B, or C above, a TIS will be recommended.

III. Review Process

A. Scope of Work

Prior to preparation of a TIS, the PS & E Section will provide pertinent information which shall include the following:

1. Intersections to be analyzed
2. Roadway segments to be analyzed
3. Method of projecting traffic growth
4. Traffic counts to be obtained
5. Method of generating trips

B. Preliminary TIS

Prior to the analysis of roadways and intersections a Preliminary TIS consisting of all work preceding these analyses shall be submitted to the PS & E Section. This information is required so as to avoid the unnecessary repetition of analyses. The PS & E Section shall respond by approving the Preliminary TIS either as submitted or with exceptions. If significant problems are found, e.g. unacceptable traffic counts, further submissions at this stage may be required.

C. TIS

Five (5) copies of the TIS shall be submitted to the PS & E Section for Departmental Review. The PS & E Section will then send a copy to the developer and one (1) copy each to the Delaware Transportation Authority (DTA), the Bureau of Traffic and other sections as deemed appropriate and will solicit written comments from them. The PS & E Section shall review the capacity analyses in the TIS and provide an initial response based on this review and any comments from DTA and the Bureau of Traffic.

D. Department Recommendations and Comments

When the Department finds that the TIS is adequate and agrees with its conclusions the PS & E Section shall provide the relevant agencies with the Department's recommendations and comments. Copies of this letter shall be provide to the applicant, the consultant (if any), the DTA, and the Bureau of Traffic.

IV. TIS Outline and Format

The following outline details what is expected in a TIS. Items B through G and K.1. shall constitute a Preliminary TIS but should also be resubmitted in the final document. Regarding format, a table of contents corresponding to this outline should be included and all pages should be numbered.

- A. Executive Summary
- B. Project Description
 - 1. Narrative and Illustration
 - 2. Exploratory Site Development Plan
- C. Study Area
 - 1. Narrative
 - 2. Location Map (1" - 0.5 mi)
 - 3. Schematic Diagram(s) of Existing and Future Roadways
- D. Existing Traffic
 - Narrative and Diagrams of Seasonally Adjusted Peak Hour Traffic
- E. Trip Generation
 - Narrative and Calculations
- F. Trip Distribution
 - Diagrams of both Percentage Distributions and Distributed Trips
- G. Future Traffic
 - Diagrams of Future Peak Hour Traffic both with and without Site Traffic added
- H. Capacity Analyses
 - 1. Narrative (Standards and Methodology Used)
 - 2. Table(s) Showing Levels of Service
 - a. Existing
 - b. Future without project
 - c. Future with project and proper entrance
 - d. Future with project, proper entrance and off-site improvements (if needed)
- I. Recommendations
 - 1. Narrative, including any proposed signal timings and a development phasing plan, if needed, to maintain Level of Service D.

- 2. Illustrations of off-site improvements (if needed)
- 3. Illustration or plan of entrance(s)

J. Conclusions

K. Appendices

- 1. traffic Count Summary Sheets
- 2. Capacity Analysis Worksheets
- 3. Signal Timing Worksheets (if needed)

V. Project Description

This part of the TIS should include as much information as is available regarding the proposed land use. Residential developments should be described in terms of the type and number of dwelling units, e.g. 32 single-family detached homes. Non-residential uses should be described in terms of use and gross leasable floor area or another relevant descriptor. At a minimum the proposed use and buildable area of the site must be specified.

VI. Existing Traffic

Normally new traffic counts at all intersections in the project study area will be required. If another TIS has recently been done in the area, the PS & E Section may provide copies on request and the traffic counts from such a TIS may be used. Other traffic counts which may also be acceptable may be available from the Bureau of Traffic.

If new traffic counts are required, they should normally be conducted from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. on a Tuesday, Wednesday, or Thursday. These days and times may differ however depending on the type of development proposed. In no case should a count be conducted within one day of a holiday or in inclement weather conditions. In all cases a seasonal adjustment factor provided by the PS & E Section should be applied, and data should be entered on standard DelDOT Forms.

VII. Trip Generation and Distribution

There are essentially three acceptable sources of trip generation data. In most cases, rates from a standard reference such as ITE Trip Generation or FHWA Development and Application of Trip Generation Rates will be acceptable. Traffic counts taken by the consultant at similar sites may be used with the approval of the PS & E Section. Finally, secondary measures of traffic, such as receipt counts or parking lot traffic may be accepted in some cases. In all cases, the method of trip generation must meet with the approval of the PS & E Section.

Trip distribution shall be done by assigning percentages of the traffic entering and leaving the site to the principal directions of travel. This shall be done separately for different types of land use within the site. Generally, inbound and outbound percentage distributions in the A.M. peak hour should be the reverse of the P.M. peakhour. Where a different distribution is used, it should be justified.

VIII. Future Traffic

There are two acceptable ways of projecting future traffic. One means is growth factors by which existing volumes should be multiplied. The other way is to assume in conjunction with the PS & E Section and the local zoning agency certain types and levels of development for the undeveloped land in the study area and to generate and distribute trips for these developments. The PS & E Section shall determine which method is appropriate and shall provide either growth factors or if the zoning agency requests, a list of developments to address.

Future traffic should be calculated for conditions in the project's year of completion and, if specified by the PS & E Section, at other significant conditions such as before or after highway projects.

IX. Capacity Analyses

All analyses shall be done in accordance with the 1985 Highway Capacity Manual (HCM). Regarding signalized intersections, the Planning Analysis procedure may be used in rural or suburban areas to reduce the number of intersections assessed through the Operations Analysis procedure. Any signalized intersection operating near or over capacity according to Planning Analysis shall be analyzed using Operations Analysis. In urban areas, only Operations Analysis is acceptable.

Computer software is an acceptable aid in analysis and in many cases is the only practical way to do it. The TIS should specify what software was used (FHWA Highway Capacity Software is recommended) and include completed input worksheets from the 1985 HCM as well any printed output from the software. If software is not used, all worksheets should be appended.

Levels of service shall in most cases correspond directly to those in the 1985 HCM. However, in the case of signalized intersections, an X requirement is also significant in determining level of service. Level of service requirements for signalized intersections are detailed in Table 2.

X. Recommendations

The purpose of a TIS is to determine what, if any, highway improvements would be necessary to accommodate a proposed development at satisfactory levels of service.

If capacity analyses using the existing or anticipated highway system and full development show that unsatisfactory levels of service will result, recommendations should be made as to how this may be prevented. These recommendations might include but are not limited to phasing of development to the completion of highway projects, reducing the proposed density of development, or construction of off-site improvements by the developer. In all cases, a site entrance which meets the requirements of the Department's "Policy and Standards for Access to State Highways" shall be recommended.

If the construction of off-site improvements is recommended, these should be illustrated at a scale of 1"=100'. If these improvements include the installation of a traffic signal or the retiming of an existing one, the proposed timing should be appended to the TIS. All proposed improvements should be supported by capacity analyses. Proposed signals should be supported by MUTCD warrant investigations, copies of which should be appended. If a signal is needed to improve levels of service but is not presently warranted, one may still be recommended that one be installed when it is warranted.

TABLE 1

ADT WARRANTS FOR TRAFFIC IMPACT STUDY

<u>Proposed Land Use</u>	<u>TIS Required If Site ADT Will Exceed</u>
Residential	2,100
Multi-Family	2,100
Retail Commercial	3,100
Restaurants (include "fast food")	1,000
Office	2,500
Industrial	2,000
DPUD	2,000

TABLE 2

LEVEL OF SERVICE REQUIREMENTS FOR SIGNALIZED INTERSECTIONS

Level of <1.0 Service	X <0.90 Delay (sec/veh)	0.90<X Delay (sec/veh)	<0.93 Delay (sec/veh)	0.93<X Delay (sec/veh)	<0.95 Delay (sec/veh)	0.95<X Delay (sec/veh)
A	<5.0	---		---		---
B	5.1 to 15.0	---		---		---
C	15.0 to 25.0	<25.0		---		---
D	15.1 to 40.0	25.1 to 40.0		<40.0		---
E	40.1 to 60.0	40.1 to 60.0		40.0 to 60.0		<60.0
F	>60.0	>60.0		>60.0		>60.0

1. Developments not addressed here will be reviewed on an individual basis.

2. As proposed by Donald S. Berry at the 66th Annual Transportation Research Board Meeting, Washington, D.C. January 1987.